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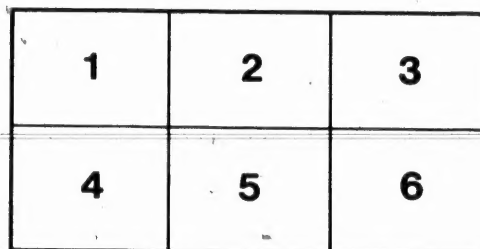
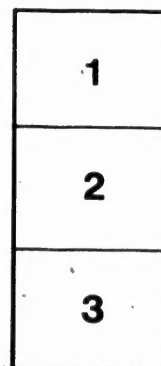
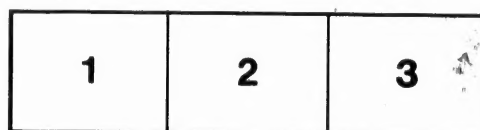
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REPORTS

ON THE PROPERTY OF THE

AMERICAN COPPER MINING COMPANY,

COMPRISING

TWO HUNDRED ACRES OF LAND

IN BROME AND SUTTON,

CANADA EAST.

BOSTON:

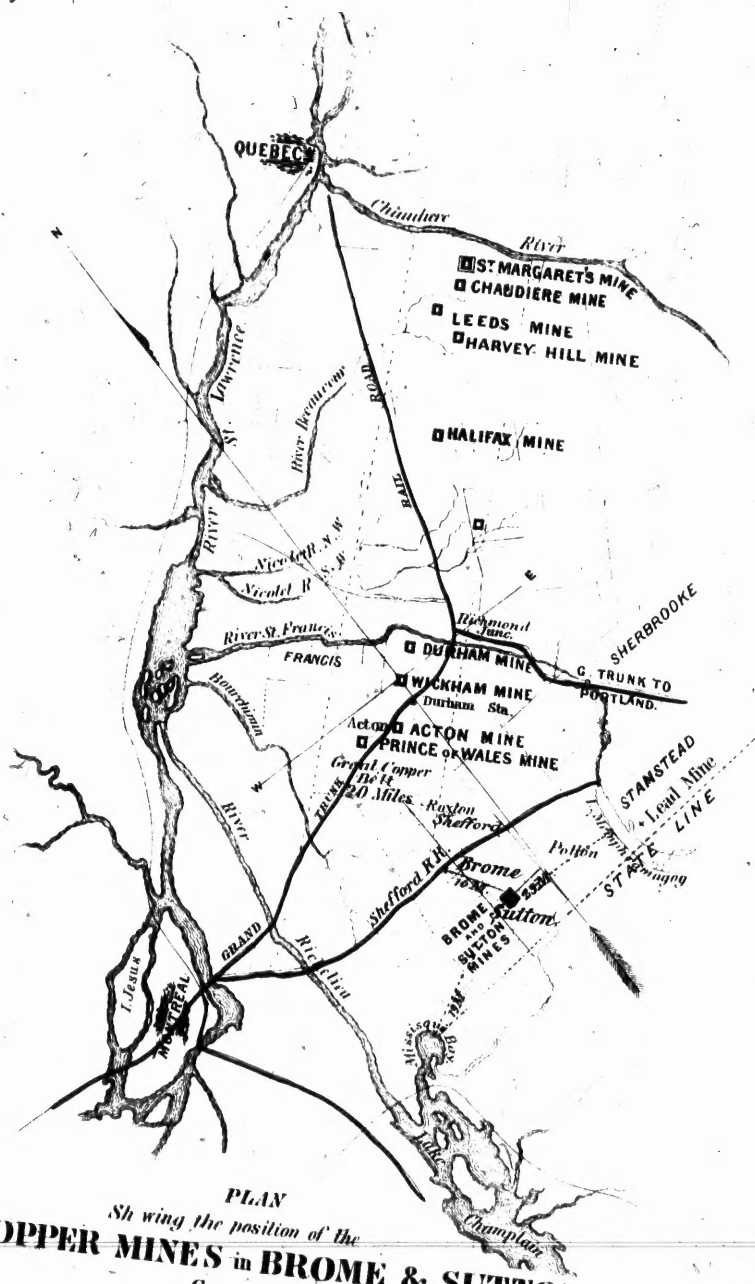
PRESS OF GEO. C. RAND & AVERY, 3 CORNHILL.

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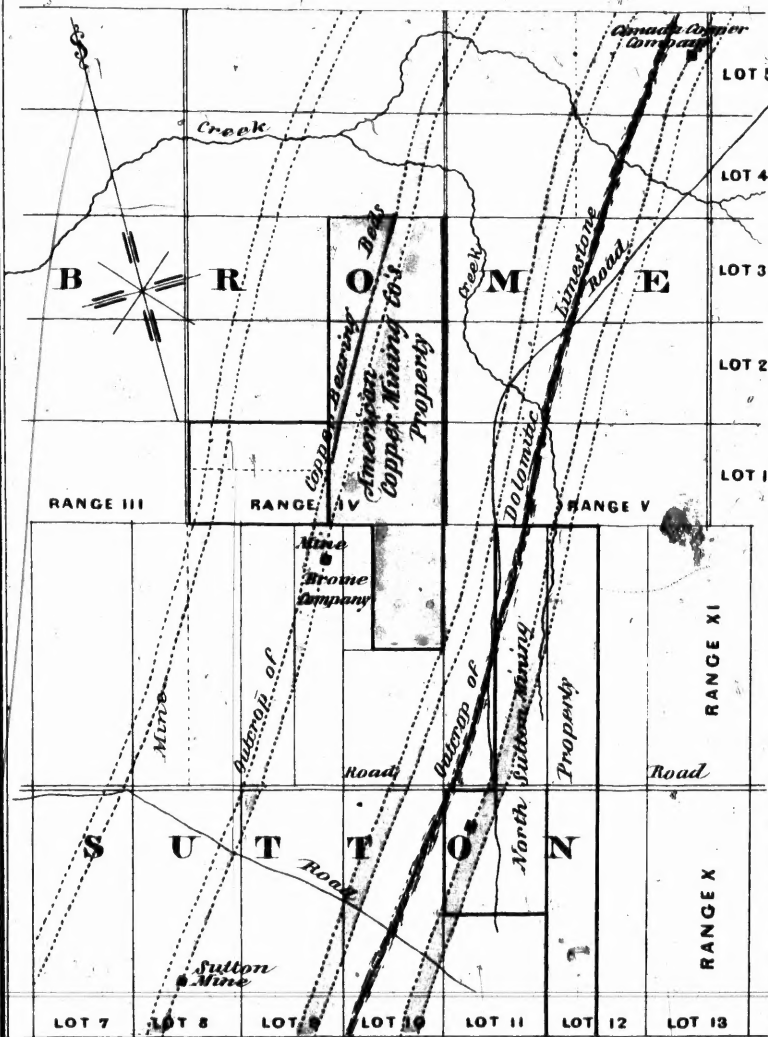






PLAN
 Showing the position of the
COPPER MINES in BROME & SUTTON
 Canada East.
 J. Prang & Co Lith. Boston.

P L A N
OF THE
American Copper Mining Company's Location
Canada East.



Lots colored the Property of the Company.

Scale, 48 Chains to 1 inch.



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REPORTS

ON THE PROPERTY OF THE

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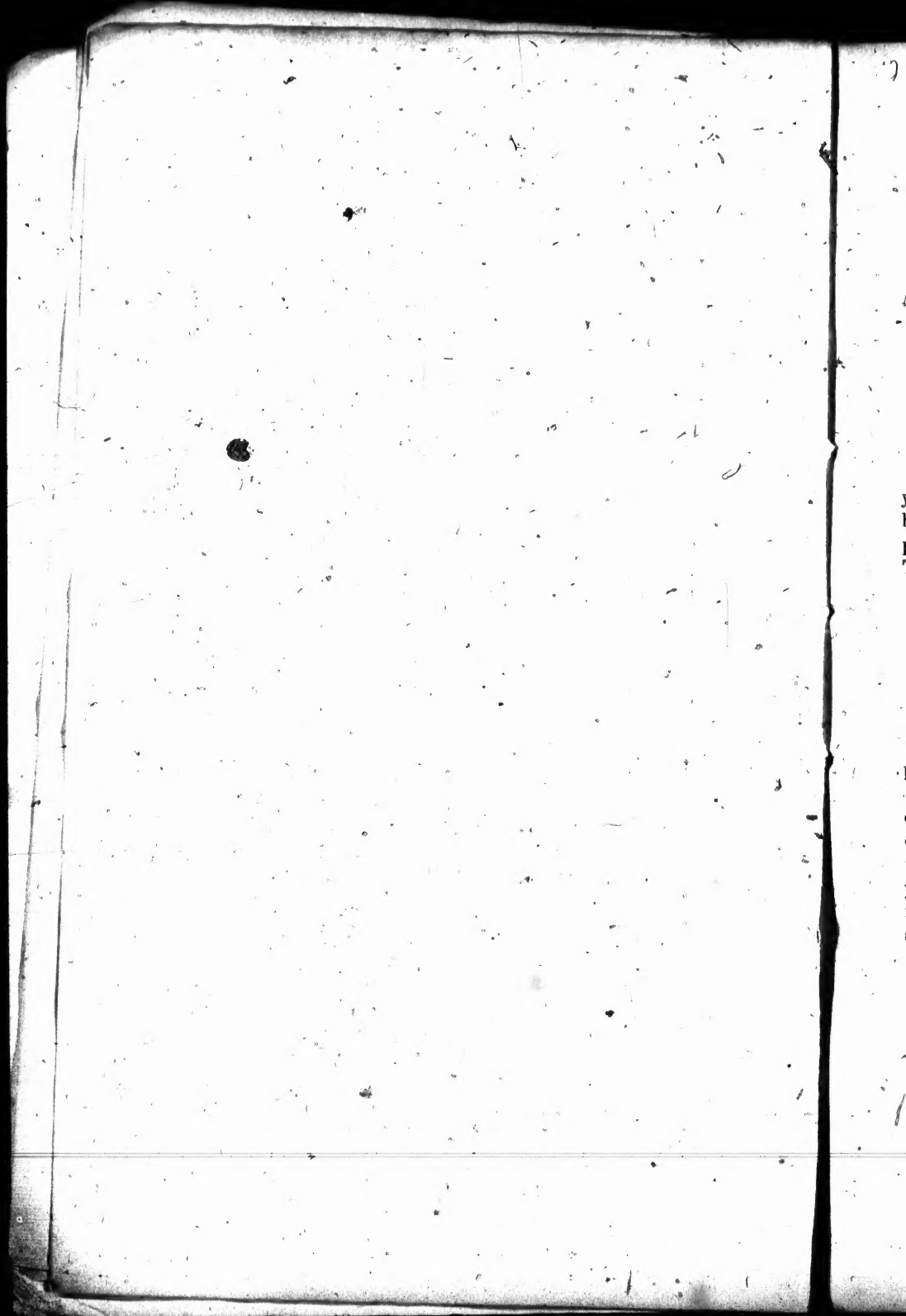
IN BROME AND SUTTON,

CANADA EAST.

BOSTON:

PRESS OF GEO C. RAND & AVERY, 8 CORNHILL

1864.



AMERICAN COPPER MINING COMPANY.

REPORT ON THE PROPERTY OF THE COMPANY,
BY MR. CHARLES HOBBS, MINING ENGINEER.

GENTLEMEN:—I beg to submit the following remarks on your copper-mining locations in Brome and Sutton, which I have recently inspected. I also enclose a map showing its position, and the direction of the metalliferous veins or beds. This property consists of the following lots, viz.:

1 east half of lot 1 in the 4th range of Brome,	100 acres.
2 part east half of lot 2 " 4th " of "	25 "
3 " west " " 3 " 4th " of "	50 "
4 " north " " 10 " 11th " of Sutton	37 "

Comprising in all 212 acres

The mineral rights on all these lots are held by you in perpetuity, exempt from all dues or Royalty.

These lots are immediately contiguous to the Sutton Mine on the one hand, and the Brome Mining Company's locations on the other. I have no hesitation in stating that it is a most valuable property. It is an undoubted fact that the same copper-bearing beds, which are worked at both the above-named mines, traverse this property throughout its entire length, and the same results will be attained here. Very little work has been done on the lots in question, but the copper-ore shows rich at the surface in several places. I regard the prospects for mining here as almost certain of success, so far as such can be predicted of any mining adventure.

For detailed particulars, I beg to refer you to the printed Reports on the Sutton, Canada, and Brome Mining Company's properties.

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REPORT BY MR. THOMAS PETHERICK,
ON THE CANADA COPPER COMPANY'S MINE.

GENTLEMEN:—I submit to you my Report of my examination of the mineral property at Thomas Sheperd's, in Brome County, Canada East.

On this property a most satisfactory development has recently been made of copper-ore, which, looking to the shallowness of the openings on it, presents unusually good prospects. Trial-pits have been sunk a few feet on a cupriferous vein at different points on the line of it, for about 700 feet length, bearing about northeasterly and southwesterly. The vein, as are also the containing rocks, is nearly perpendicular, its size varying from five and six feet to ten feet or more in width. All the explorations are very shallow, and have yet but imperfectly proved either the size or the other circumstances of the vein; still enough has been done to show its great probable importance and very favorable composition, and that the prospects are of the most satisfactory description.

The primitive rock extending through the property is quite congenial to mineral productiveness.

The vein above noticed is composed of silicious matter, more or less indurated "flookan," quartz, carbonate of lime, a considerable proportion of rich yellow copper pyrites, vitreous copper ore (of a high percentage of metal), and green carbonate of copper. It is important to observe that the substances in which the ore is embedded in the vein are of such a nature that it can be very easily reduced, and the ore separated from it by the usual mechanical means, with great facility.

But it is not on this vein only that the favorable opinion which I have formed of this mineral property is founded. In copper-mining the plurality of veins, independent of its obvious importance *per se*, is a decidedly favorable characteristic

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in regard to the locality in which it obtains. I am pleased to observe that this property stands in a very favorable light in this respect, as the following statements will show :—

Nearly opposite the western part of the 700-foot line of ex-
plorations on the vein already described, and about 70 to 80 feet southwesterly from it, a vein has been struck, seven feet wide in a shallow trial-pit. Its prospects are decidedly favorable, containing "gossan" and "mundic" (sulphuret of iron), both favorable accompaniments for copper, as indications. No time should be lost in effecting a deeper trial of this vein, and of that next referred to, and perhaps of others. It is obviously of great importance to ascertain speedily the circumstances of the different veins, in order to determine intelligently, at an early period, the system of operations best calculated to promote the greatest ultimate success of the whole undertaking.

About 140 feet southeasterly from the last trial-pit, and a few yards south of the apparent course of the vein there, another very promising vein has been partially developed, its size not being yet ascertained. It has a very favorable appearance, so far as opened, containing copper and iron pyrites, &c. Near this point, copper-ore, the yellow sulphuret, appears in places on the very surface of the ground. No opening has yet been made on it.

What other metallic veins are in the property is obviously an important question, which can only be solved by further explorations.

From a deep gorge in the western part of the property to its eastern line, the distance on the course of the veins is probably about 2,500 feet. In the absence of a regular survey, I cannot state with confidence the height of the ground in the property at the summit. It may probably be 250 feet or more above the level of the creek at that gorge; from whence a level being driven on the course of one or more veins would effect the drainage, and afford the best facilities for the most effective and advantageous prosecution of the works. From the creek, where there is a powerful stream of water, with a great fall, ample power can be obtained for preparing the ore for market and other purposes.

SUPPLEMENTARY REPORT FROM MR. PETHERICK.

I repeat my suggestion that an instrumental survey be promptly made of the Sheperd Copper Lands, Canada East. Fully satisfied as I am of the excellent prospects of the mining there, and that very remunerative returns of ore can be speedily effected by the judicious outlay of a very moderate capital for placing the operations upon a suitable and economical system; still, such a survey is desirable to be speedily made, to enable the parties interested to estimate the great value of the large production of ore which I confidently anticipate *from the establishment of SUCH SYSTEM.*

The length over which the veins *yet* discovered and opened extend through the property, I assumed, in the absence of actual measurement, to be about 2,500 feet. The aggregate length of the three veins opened (we know there are other veins) would therefore be 7,500 feet, or 1083 fathoms, which, taking the average width of the respective veins to be six feet, gives 1,083 *cubic fathoms* for every six feet height of vein! This will show you the great importance of having the ground from the creek upward, in the direction of the veins, properly levelled, in order to arrive at a satisfactory estimate of the extent of mining ground on those three, as well as other veins, *workable above water level*, and therefore free from any expense for pumping.

I am, Gentlemen,

Very respectfully yours,

THOS. PETHERICK,
Mining Engineer

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REPORT OF DR. C. T. JACKSON, ON THE SUTTON MINE.

GENTLEMEN:—Having visited and examined the Copper Mine belonging to Solomon Sweet & Co., in the township of Sutton, Canada East, I have to submit the following Report:—

SITUATION OF THE MINE.

The mine is situated in North Sutton, Lot 8, Range 10, and is sixteen miles from the station at West Farnham, on the Stanstead, Shefford, and Chambly Railroad; twenty-three miles from the Lake Memphramagog, and nineteen miles from Pike River, the head of navigation on Lake Champlain.

It is near the summit of a hill, and from the immediate plain or meadow below the mine, I found the height by the pocket-level to the mine, to be 106 feet, the distance being about 1000 feet. This is the extent of natural drainage of the mine.

The land in the immediate neighborhood is cleared and cultivated, and the soil appears to be fertile, and is considered valuable for grazing. The population is sparse, and the people are mostly occupied with agriculture.

GEOLOGY OF THE REGION.

The rocks in which the copper ore is found are of the Lower Silurian or Taconic series, and consist of a pearly argillaceous slate, associated with magnesian limestone, or compact dolomite, like that of Acton. The slate strata at the mine run N. 32 degrees E., S. 32 degrees W., and dip to the northwestward 8 degrees; on another part of the hill further down the slope, the strata run N. 40 degrees E., S. 40 degrees W., and dip S. 50 degrees, W. 8 degrees.

The slates split out in large, smooth sheets, and in some places are sound enough for roofing purposes; but at the mine

the occurrence of copper pyrites in the rock renders the slate unsuitable for such uses.

Veins of quartz from an inch to two feet in thickness, bearing some purple copper ore, and beds of chlorite slate, filled with octahedral crystals of magnetic iron-ore and black oxide of manganese, also occur near the mine.

Copper pyrites is everywhere disseminated in the slate; and at the mine there are two beds, one six-tenths of a foot, and the other two feet ten inches thick, which are so thickly inter-laminated with the copper pyrites and purple copper ore as to form a good working ore of copper. These beds are part of the stratification of the country, and dip regularly with the non-metalliferous strata, having no distinct walls between them and the other slate rocks.

From the nature of the stratification, there can be no doubt that the copper ore was deposited synchronously with the state, for the layers are so arranged that they must have been deposited together; that is, while the argillaceous sediment was depositing the copper ores must also have been formed and deposited, and this operation was confined to a particular period of the formation, since it is limited in extent to the strata above named. Since the deposition of these materials in a horizontal position, the whole stratified mass has been elevated, so that the strata now are nearly vertical, or incline but ten degrees from the perpendicular.

All through Canada, where this cupriferous belt of Taconic rock appears, whether the rocks are limestone or slates, the copper ores appear as if formed in their midst. They never have the appearance of injected veins, and if they came from metalliferous emanations in a vaporous state, the elements of the ores must have come in separately, so as to form the copper ores in the pasty materials which subsequently were consolidated into rocks.

All the lodes we have thus far seen in Canada are truly beds of metalliferous rocks, and not distinct walled veins with the gossan, so commonly looked for by miners whose education has been effected in the mines of Cornwall.

THE MINE.

Near the summit of a hill, one hundred and six feet high, two belts of nacreous slate rocks, thickly interlaminated with copper ore, appear cropping out on the surface, and are distinguishable from the darker colored slate, by their light brownish tint. One of these beds is six-tenths of a foot wide, and is quite rich in copper ore. Eight feet farther west we see another similar bed, which is one foot thick. Quartz veins or beds also occur a few inches wide, and bear purple ore, some of the solid veins in which are from half an inch to one inch in thickness.

One of those quartz veins is eighteen inches thick, and bears strings of purple copper ore a quarter of an inch thick. All these beds have been superficially opened to the depth of a few feet for exploration. A cross-cut has also been made on the strata by a shallow ditch, and a bed of chlorite slate, stained black by oxide of manganese, or black wad, and filled with small crystals of octahedral magnetic iron ore, has been exposed.

A shaft has been sunk in the outcrop of the two cupriferous beds above mentioned, to the depth of seventy feet perpendicularly; and consequently has passed through them at the depth of twenty feet, the shaft being eight by nine feet square, nearly. The miners here lost the ore, and sunk fifty feet lower without finding it, of course, and concluded that there had been some shift or fault in the lode. They therefore stopped working below, and on tribute cut out from the depth of twenty feet to the surface, making an oblique stope from the shafts. This operation showed great recklessness or want of skill; and so far as the work extends, it is injurious to the mine, and will require to be walled up to keep the surface water from the mine. All this work is not lost, for it will be advisable to make the shaft twelve feet by eight feet, and this elongation will take in much of the stoped ground. A cross-cut to the westward, eight feet from the west side of the shaft, at the depth of seventy-feet, should reach the ore bed, the departure of the bed from the perpendicular being twelve feet. The stope cut

out from the shaft begins at twenty feet from the surface, and is seven feet wide; it is cut back about ten feet from the shaft.

Owing to the mine being filled with water up to within twenty-five feet of the surface, I could not view it lower down, but was informed by Mr. Sweet, that purple copper ore was obtained at the depth of forty feet. If this is the case, then there must be another cupriferous belt, which was cut by the shaft at that depth, for we have seen that the beds seen on the surface leave the shaft at the depth of twenty feet.

In future operations, it will be best to run a level into the hill on the course of the lode at some convenient point, say on a line with the bottom of the present shaft, and to stope out the ore above, at a suitable time after another shaft has been sunk, so as to strike the ore beds deeper. Such a level stoped at any time will not injure the mining ground, for the water will run off freely to lower ground, the inclination being large.

The cost of transporting the ore from this mine to West Farnham Railroad station, sixteen miles distant, is two dollars per ton. To Memphramagog Lake, distance twenty-three miles, the cost will be three dollars per ton, and by railroad from thence to Boston, five dollars per ton; or eight dollars per ton in all to Boston. It will cost about as much to take it to Pike's River, nineteen miles, and by water to New York by Lake Champlain and canal.

The land included in the lease or sale of this mine is one hundred and twenty acres, and the extent of the copper beds on it is half a mile on the course of the beds.

If the ore from the Sutton Mine, dressed by bucking, was raised to ten or twelve per cent., as we were informed, it is obvious that by proper machinery it may be raised to twenty per cent., and much ore that is necessarily lost in waste by bucking or spalling will be saved.

I advise the use of stamps and the round buddles as applicable to the dressing of this ore. Water sufficient for the dressing-house may be had from springs in the hill and from the mine; and it will be easy to construct a reservoir at a sufficient height above the dressing-house to secure an adequate and regular supply for the machines.

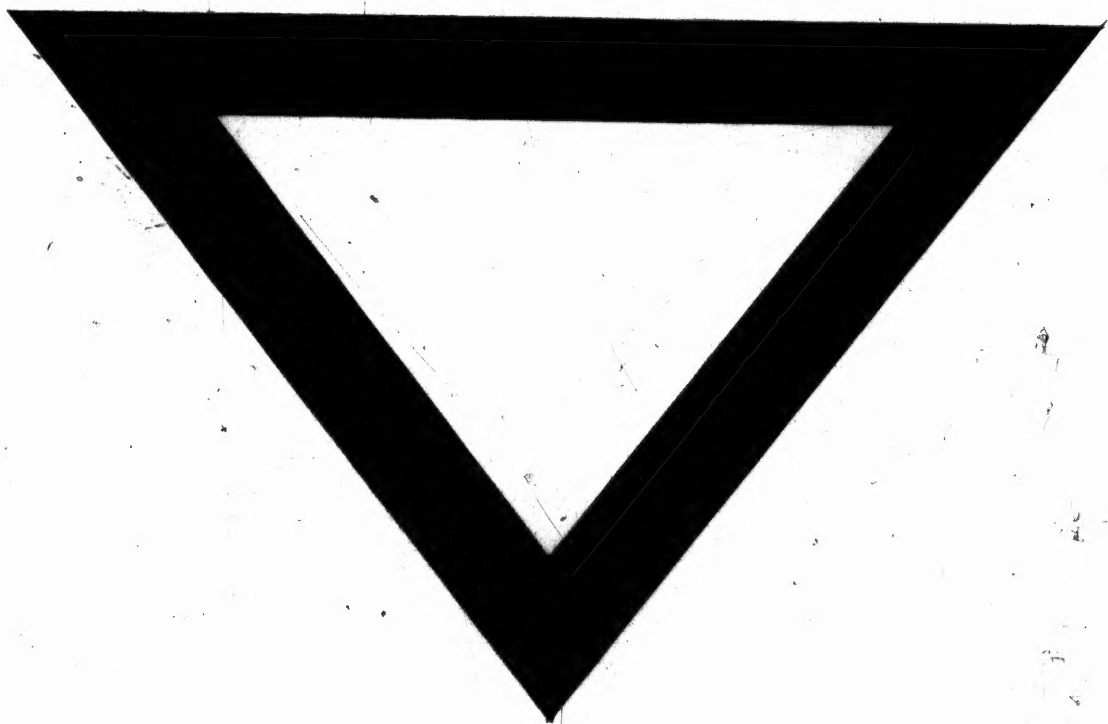
DRESSING OF THE SUTTON COPPER ORES AND ASSAYS OF THE
DRESSED ORES.

In order to ascertain if the poorer ores from the Sutton Mine could be dressed to a higher percentage, I took one pound of the ore, which consisted of interlamination of copper pyrites and slate rock, reduced it to a powder and sifted it, and then washed it in an ordinary gold pan. This ore was estimated to yield about ten per cent. of copper pyrites, or three per cent. of copper. On washing it, one and a half ounces of washed ore was obtained, or ten and seven-tenths per cent. of ore of copper; and, as proved by dissolving out the ore, and weighing the rock remaining, the washed ore contained fifty per cent. of rock and fifty per cent. of copper pyrites; the copper therefore should be in this fifteen per cent., and by assay I found that it yielded 14.42 per cent. of pure metallic copper. By means of a round Welsh buddle, this ore can be washed to a still higher grade.

A sample of the bucked erubescite, or purple copper ore, from the shaft of the Sutton Mine, was also tried. Four ounces of it were washed to one ounce of very clean ore, which was found to contain 75.7 per cent. of the ore, and 24.3 of rock.

This washed ore yielded 46.02 per cent. of pure metallic copper, and the pure ore, free from all rock, yielded 60.766 per cent. of copper. It is obvious, therefore, that these ores can be easily dressed to as rich a state as the market requires. At the present price of copper ore, five dollars per unit per ton, 14.42 per cent. ore is worth \$72.10 per ton, and 46.02 per cent. is worth \$230.10 per ton.

C. T. JACKSON, M. D.,
Geologist and State Assayer.



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